

US EPA ARCHIVE DOCUMENT

# **Technical Assistance for Developing Nutrient Site-Specific Alternative Criteria in Florida**

**DRAFT**

June 2011

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## Contents

I. Purpose .....	1
II. What SSAC Are and When They Are Appropriate.....	1
III. Process for a Proposed SSAC .....	4
A. Process Overview.....	5
B. Who May Submit a SSAC Proposal .....	7
C. Where Entities Should Submit SSAC Proposals .....	7
IV. Data Requirements, Analyses, and Other Information Necessary to Support a Proposed SSAC.....	8
A. Introduction .....	9
B. Fact Sheet to Accompany the Proposed SSAC.....	11
C. Data Requirements .....	12
D. Downstream Protection Requirements.....	13
E. Developing Site-Specific Alternative Criteria for Lakes.....	14
1. Replicating EPA's Methodology for Lakes.....	15
2. Using Site-Specific Biological, Chemical, and Physical Data.....	17
3. Using Other Scientifically Defensible Methods.....	18
F. Developing Site-Specific Alternative Criteria for Streams.....	21
1. Replicating EPA's Methodology for Streams .....	22
2. Using Site-Specific Biological, Chemical, and Physical Data.....	23
3. Using Other Scientifically Defensible Methods.....	24
V. Considerations for Using Loads and TMDL Targets when Deriving Proposed SSAC.....	28
A. Use of Concentration-Based Criteria and Supplemental Load Information.....	28
B. Considerations for Using TMDL Targets When Deriving Proposed SSAC .....	29
C. SSAC, Existing TMDLs and Resultant NPDES Permit Limits.....	30
Appendix A. Data Quality .....	31
A. Data Quality Considerations for Developing Site-Specific Alternative Nutrient Criteria for Florida's Lakes .....	31
1. Data Quality Objectives Used in EPA's Approach for Developing Lake Criteria .....	31
2. Recommended Data Quality Procedures for Conducting a Biological, Chemical, and Physical Assessment of Lake Conditions.....	33
3. Recommended Data Quality Procedures for Using Another Scientifically Defensible Approach for Developing SSAC that Is Protective of the Designated Use .....	35

B. Data Quality Considerations for Developing Site Specific Alternative Nutrient Criteria for Florida's Rivers and Streams.....	37
1. Data Quality Considerations that EPA Used in Developing Nutrient Criteria for Florida Rivers and Streams .....	37
2. Recommended Data Quality Procedures for Conducting a Biological, Chemical, and Physical Assessment of River and Stream Conditions .....	38
3. Recommended Data Quality Procedures for Using Another Scientifically Defensible Approach for Developing SSAC that Is Protective of the Designated Use .....	39

## **Figures**

Figure 1. Mechanisms for addressing site-specific conditions .....	4
Figure 2. Flow diagram of process for a proposed SSAC .....	5
Figure 3. Example of "fact sheet" to include with a submittal .....	11
Figure 4. Example of site-specific nutrient stressor-response relationship. ....	16

## I. Purpose

The purpose of this technical assistance document is to help the state of Florida and other stakeholders develop alternatives to EPA's numeric criteria for Florida's waters, called site-specific alternative criteria (SSAC), and to propose them to EPA for consideration. SSAC are values that would take the place of the total nitrogen, total phosphorus, nitrate+nitrite, and/or chlorophyll *a* criteria in 40 CFR 131.43. The final rule that established these criteria, "Water Quality Standards for the State of Florida's Lakes and Flowing Waters", was published in the *Federal Register* on December 6, 2010 (found in Vol. 75, No. 233, p. 75762) and goes into effect on March 6, 2012. The rule has a provision at 40 CFR 131.43(e) for establishing site-specific alternative criteria that would apply in lieu of the criteria established in 40 CFR 131.43(c); entities may submit proposed SSAC, accompanied by supporting documentation, for EPA to consider. The SSAC-related provision of the rule went into effect on February 4, 2011. This document outlines the process that a SSAC submission will go through and provides detailed information on the scientific approaches and analyses that can be used and on the documentation that should be submitted to support the proposed SSAC.

The key principles of this technical assistance document are the following:

- Site-specific alternative criteria must assure attainment of Florida's designated uses<sup>1</sup> with respect to nutrient-related causes of impairment.
- When reviewing proposed SSAC, EPA will adhere to existing applicable regulatory requirements related to water quality standards.
- The SSAC provision in 40 CFR 131.43(e) applies only to adjustments to the criteria values in 40 CFR 131.43(c).
- Such adjustments must be based on technically sound and detailed site-specific or watershed-specific data and analysis.

## II. What SSAC Are and When They Are Appropriate

EPA regulations at 40 CFR 131.11(a)(1) require that water quality criteria must protect applicable designated uses. Such criteria must be based on sound scientific rationale and must contain sufficient parameters or constituents to protect the designated use. As provided at 40 CFR 131.10(b), a state's water quality standards, which include water quality criteria, developed under the Clean Water Act (CWA) must also provide for the attainment and maintenance of water quality standards of downstream waters.

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<sup>1</sup> The designated uses established by Florida that are protected by criteria in 40 CFR 131.43 are:

- Class I – Potable Water Supplies.
- Class III – Recreation, Propagation and Maintenance of a Healthy, Well-Balanced Population of Fish and Wildlife.

SSAC are alternative values to the criteria for total nitrogen (TN), total phosphorus (TP), nitrate+nitrite, and/or chlorophyll *a* that are established in 40 CFR 131.43. SSAC do not modify the designated use(s) of a waterbody; rather, SSAC are alternatives to the existing criteria that protect the designated use(s) of the affected water. SSAC can apply to a single waterbody, waterbody segment, group of waterbodies with similar characteristics, or group of waterbodies in a watershed. These SSAC must meet the regulatory requirements of protecting the instream (or in-body) designated use of the affected waterbody, having a basis in sound science, and ensuring the attainment and maintenance of downstream water quality standards.

SSAC may be more or less stringent than the federal numeric nutrient criteria. In circumstances where an entity submits alternative criteria that are more stringent than those in 40 CFR 131.43, the entity must include an analysis showing that EPA's promulgated criteria are not sufficiently protective of the designated uses for that specific waterbody. When a proposed SSAC does not address all criteria established in 40 CFR 131.43 for a given waterbody, then any unadjusted criteria in 40 CFR 131.43 continue to apply to that waterbody. Consistent with EPA's final rule, a SSAC must be expressed in the form of a concentration along with its intended spatial application. The SSAC proposal may also include a criterion expressed as a corresponding load that is consistent with the proposed concentration, with the associated factors and assumptions used in the calculation or conversion. The entity proposing the SSAC should include documentation showing how the supplemental load information is consistent with the proposed SSAC concentration. Additional detail explaining concentration-based criteria and the supplemental loading information is described in section V.A. While a concentration-based criterion is expected to be applicable for all purposes of the Clean Water Act, EPA recognizes that an associated load could be useful in source control. For NPDES-permitted discharges, because the criteria at 40 CFR 131.43 are expressed as concentrations, resultant permit limits will generally be expressed as concentrations as well, with an option for the permitting authority to include a supplemental mass-based limit. Neither the regulations at 40 CFR 131.43 nor the SSAC process changes the terms of any NPDES permit, and deriving permit limits remains under the jurisdiction of the permitting authority. Similarly, for waters that have TMDL targets or allocations expressed as loads, neither the regulations at 40 CFR 131.43 nor the SSAC process changes the terms of the TMDL. However, it should be noted that the load associated with a point or nonpoint source discharge usually will not be the entire load for a given waterbody. Furthermore, EPA finds it reasonable to presume that basing NPDES permit limits on existing TMDLs will result in effluent limitations as stringent as necessary to meet the federal numeric nutrient criteria. In carrying out its permit review oversight responsibilities, EPA intends to exercise its discretion by presuming that NPDES permits proposed by FDEP that implement wasteload allocations in current TMDLs will result in effluent limitations that reflect the necessary loading reductions to assure attainment of the new criteria. Additional

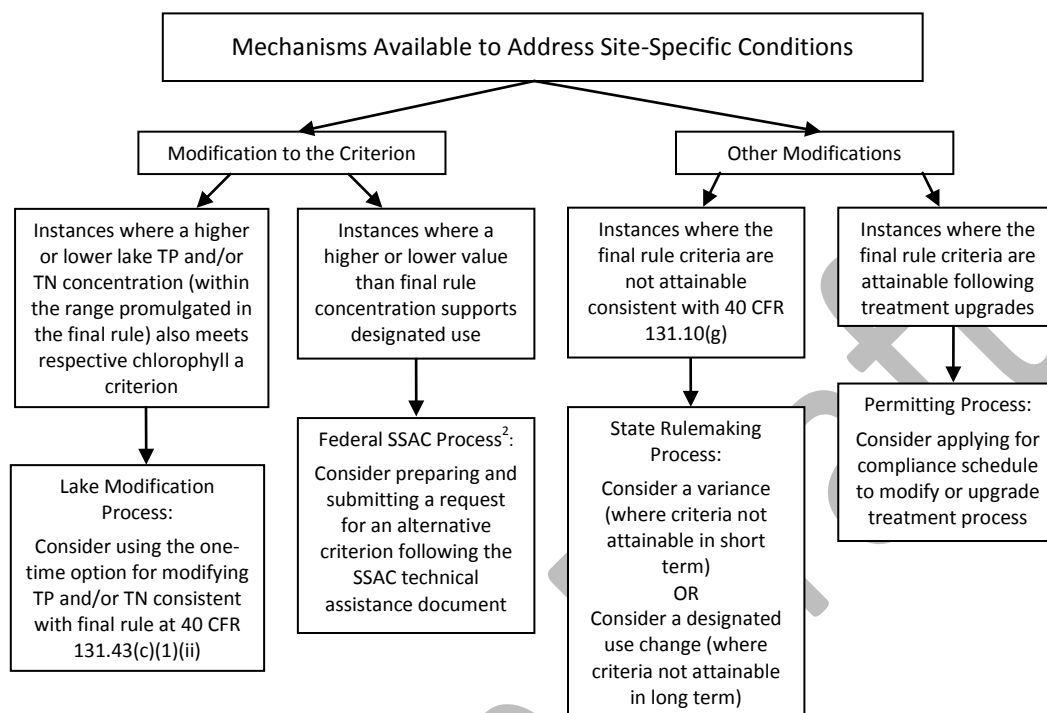
information related to SSAC and their relationship with TMDLs and NPDES permits is in sections V.B and C.

The SSAC process provides a mechanism to address situations when adjustments to criteria are appropriate to address site-specific conditions beyond the modification provision in 40 CFR 131.43(c)(1)(ii). This modification provision allows the state to calculate modified TN and/or TP criteria that fall within the range of values in Table 1 in 40 CFR 131.43(c)(1) for a lake when the chlorophyll *a* criterion is not exceeded. This modification provision is available one time for a given lake; any further adjustment to a lake's TN and/or TP criteria has to be done through the SSAC process. In addition, mechanisms such as variances, compliance schedules and designated use changes (via use attainability analyses (UAAs)) are available that also provide entities flexibility. Where criteria cannot be achieved for reasons of economic feasibility or other factors listed in 40 CFR 131.10(g), the state could adopt a variance or consider changing the designated use. Figure 1 illustrates when a certain mechanism might be appropriate for a given situation.

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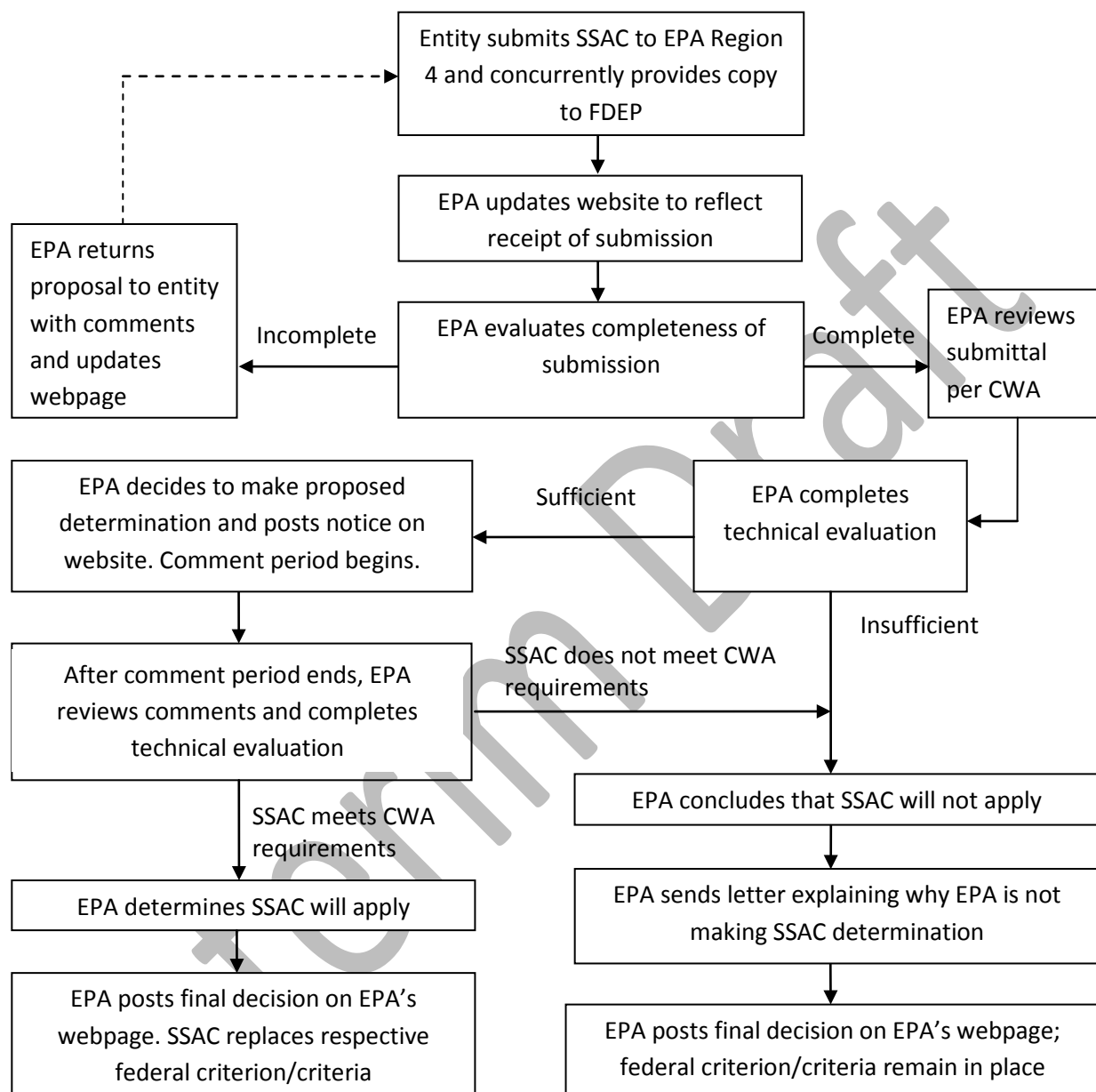
<sup>2</sup> The federal SSAC process is separate and independent from Florida's SSAC process. The State has the option to submit a SSAC request to EPA under the federal process described in this document and set forth at 40 CFR 131.43(e). There is no requirement in the federal rule that the State go through its own state-level Type I or Type II SSAC process before submitting a proposed SSAC to EPA for consideration. Florida's rules that describe the process for obtaining a state-level Type I or II SSAC can be found in F.A.C Chapter 62-302.800. The federal SSAC process does not prevent the State from initiating and conducting its own rule making to develop new or revised criteria. Recently the State adopted new provisions for changing the designated use of its waterbodies. In any case where the State changes the designated use of a waterbody from Class I or III to something else, and EPA approves that change, EPA's federal criteria would no longer apply to that waterbody, and the federal SSAC provision would no longer be available for that waterbody. In any case where Florida adopts site-specific criteria for the revised non-Class I or III designated use, such revision would be subject to EPA's review under CWA section 303(c).

**Figure 1. Mechanisms for addressing site-specific conditions**



### III. Process for a Proposed SSAC

The process for a proposed SSAC is outlined in Figure 2 and described in subsection A. Subsections B and C provide details about who may submit a proposed SSAC and where those submissions should be sent. Section IV contains information on the data requirements, analyses, and documentation necessary to support a SSAC submission.

**Figure 2. Flow diagram of process for a proposed SSAC****A. Process Overview**

As stated in 40 CFR 131.43(e), a SSAC may be established by the Regional Administrator of EPA Region 4 after providing notice and opportunity for the public to comment. An entity proposing a SSAC must compile the supporting data, analyses, and any other relevant documentation to demonstrate that each alternative criterion is fully protective of the applicable designated use(s) and submit the package of information to EPA and Florida's

Department of Environmental Protection. EPA will provide information on SSAC submissions and their review status on EPA's Florida Nutrient Rule webpage.<sup>3</sup>

EPA will evaluate the completeness of the submission and the technical basis of the proposed SSAC and determine whether the SSAC are protective of the designated use, based on sound science, and protective of downstream waters. Possible EPA actions include the following:

1. The Regional Administrator may decide to return the proposal to the entity with an explanation why the proposed SSAC submittal did not provide sufficient information for EPA to conduct a technical evaluation (i.e., submittal was incomplete).
2. The Regional Administrator may decide that the proposal from the entity contains sufficient information to conduct a technical evaluation but is not sufficient to meet Clean Water Act requirements. The Regional Administrator may then decide that the proposal does not support proposing a SSAC determination and soliciting public comment. EPA will send a letter to the entity explaining why EPA is not making a proposed SSAC determination.<sup>4</sup> This conclusion will be made publicly available.
3. If the Regional Administrator decides that the proposal contains sufficient information to propose making a determination, then EPA will prepare a technical evaluation summary<sup>5</sup> of the submitted materials and an explanation for EPA's proposed decision. EPA will post a public notice on its website, providing a link to the technical evaluation and submitted materials and soliciting comments on the proposed SSAC. Written comments can be submitted by email or standard postal delivery. After the comment period ends, the Regional Administrator will determine whether the SSAC meets the statutory and regulatory requirements for new or revised water quality standards, including 131.43(e) and 131.11. EPA's determination will be made publicly available with an explanation of the basis for the decision.

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<sup>3</sup> Details about submitted SSAC applications can found on EPA's webpage for the Florida Nutrient Rule at [http://water.epa.gov/lawsregs/rulesregs/florida\\_index.cfm](http://water.epa.gov/lawsregs/rulesregs/florida_index.cfm) or EPA Region 4's webpage for Water Quality Standards in the Southeast at <http://www.epa.gov/region4/water/wqs/index.html>.

<sup>4</sup> If the Regional Administrator concludes the SSAC does not meet the statutory and regulatory requirements, such action does not preclude or prohibit the entity from initiating another submission process in the future if additional data become available.

<sup>5</sup> In these cases, EPA's technical evaluation summary will include a compilation of relevant materials so that the public can access a short synopsis of the proposed SSAC, its coverage, its justification, and EPA's initial conclusions whether the SSAC appears to meet the statutory and regulatory requirements.

### *B. Who May Submit a SSAC Proposal*

Provisions in 40 CFR 131.43(e) allow any entity to submit proposed alternative numeric criteria and supporting documentation to the Regional Administrator. The entity that petitions for a SSAC may be the State of Florida, a city or county, a municipal or industrial discharger, a citizen group, an environmental organization, or any other individual or organization. The entity submitting a SSAC proposal bears the burden of demonstrating that the proposed SSAC meets the requirements of the CWA and EPA's implementing regulations, specifically 40 CFR 131.10 and 131.11.

### *C. Where Entities Should Submit SSAC Proposals*

Entities should submit SSAC proposals to EPA's Region 4 Regional Administrator. One method for submittal is that entities submit an electronic version of the SSAC proposal and all supporting materials to R4\_FL\_NutrientSSAC@epa.gov. If entities prefer, or also wish, to submit a paper version, then it can be sent to the following address:

Ms. Joanne Benante, Chief  
Water Quality Planning Branch  
US EPA Region 4  
Sam Nunn Atlanta Federal Center  
61 Forsyth Street, SW  
Atlanta, GA 30303-8960

If the entity submitting the proposal is not the State of Florida, the entity is also required to submit the proposed SSAC and supporting materials to the state at the same time those materials are submitted to EPA. This requirement ensures that the state has the opportunity to provide comments to EPA. Materials should be sent to the following address:

Mr. Eric Shaw, Environmental Manager  
Standards and Assessments Section  
Florida Department of Environmental Protection  
2600 Blair Stone Road Mail Stop 6511  
Tallahassee, FL 32399-2400

If the entity submitting the proposal is not a local government, EPA recommends that the entity submit a copy of the SSAC and supporting materials to the appropriate local government.

If the proposed SSAC could indirectly affect tribal waters and/or waters of other states, EPA recommends that the entity notify the relevant environmental management agencies. Materials should be sent to the following addresses, when applicable:

State/Tribe	Address
Alabama	Lynn Sisk Water Quality Branch Water Division Alabama Department of Environmental Management 1400 Coliseum Boulevard Montgomery, AL 36110-2059
Georgia	Elizabeth Booth, Program Manager Water Planning and Monitoring Program Georgia Environmental Protection Division 4220 International Parkway, Suite 101 Atlanta, GA 30354
Miccosukee Tribe of Indians of Florida	Truman E. Duncan, Director Environmental Protection Department Miccosukee Tribe of Indians of Florida P.O. Box 440021, Tamiami Station Miami, Florida 33144  An electronic copy can be emailed to gened@miccosukeetribe.com
Seminole Tribe of Florida	Craig Tepper, Director Environmental Resource Management Department Seminole Tribe of Florida 6300 Stirling Road Hollywood, Florida 33024  An electronic copy can be emailed to Ctepper@Semtribe.com  Mitchell Cypress, Chairman Seminole Tribe of Florida 6300 Stirling Road Hollywood, Florida 33024

#### IV. Data Requirements, Analyses, and Other Information Necessary to Support a Proposed SSAC

This section describes the information that entities should submit to support a proposed SSAC. Subsection B describes the fact sheet that should be submitted with the supporting documentation. Subsection C briefly describes the data requirements, which are more fully described in Appendix A, and subsection D explains the downstream protection requirements. Subsections E and F present details on how to develop SSAC for lakes and streams using the

three types of approaches briefly described in the following introduction. Although springs are not explicitly discussed, as are streams and lakes, EPA believes that the information contained in Subsections E and F provides pertinent information that can also be applied to developing SSAC for springs.

#### A. Introduction

As described in section V.C(1) in the preamble to EPA's final rule, *Water Quality Standards for the State of Florida's Lakes and Flowing Waters* (75 FR 75970-71) and listed in 40 CFR 131.43(e)(2), there are several approaches for developing SSAC to adjust the total nitrogen (TN), total phosphorus (TP), nitrate+nitrite, and/or chlorophyll *a* values in 40 CFR 131.43. One approach is to replicate the processes that EPA used to develop its lake (40 CFR 131.43(c)(1)) and stream (40 CFR 131.43(c)(2)(i)) criteria, and to apply these methods to a smaller subset of waters. Another approach relies on a biological, chemical, and physical assessment of lake and stream conditions. The regulation also has a general provision at 40 CFR 131.43(e)(2)(iv) for using other scientifically defensible approaches that are protective of the designated use.

An entity proposing SSAC must compile all of the supporting data, conduct the necessary analyses, develop the expression of alternative criteria, demonstrate that alternative numeric criteria values are fully protective of the applicable designated uses (i.e., both in the SSAC waterbodies and downstream waters), and prepare the supporting documentation to justify the change in criteria. The entity must demonstrate that any proposed SSAC meet the requirements of the CWA.<sup>6</sup> In circumstances where an entity submits alternative criteria that are more stringent than those in 40 CFR 131.43, they must include an analysis showing that EPA's promulgated criteria are not sufficiently protective of the designated uses for that specific waterbody.

Consistent with EPA's final rule, a SSAC must be expressed in the form of a concentration, along with its intended spatial application. The SSAC proposal may also include a corresponding load, with all associated factors and assumptions that is consistent with the proposed concentration. The entity proposing the SSAC should include documentation showing how the supplemental load information is consistent with the proposed SSAC concentration. Additional detail explaining concentration criteria and the supplemental loading information is described in section V.A.

As stated above, one approach for developing SSAC relies on the methodologies used by EPA in developing the water quality standards found in 40 CFR 131.43. For lakes, this approach keeps the same applicable value of chlorophyll *a*, based on lake color and alkalinity, and develops corresponding alternative TN and/or TP values. For streams, entities can use EPA's

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<sup>6</sup> EPA's implementing regulations include 40 CFR §§ 131.11 and 131.10(b).

reference-based methodology to define a sub-region within one of EPA's nutrient watershed regions and then (a) identify the subset of EPA reference sites located within the sub-region drawn from the broader regional set relied upon by EPA, or (b) develop a set of reference sites consisting of a combination of a subset of EPA's reference sites and additional sites that pass EPA's screening methodology to establish alternative TN and/or TP values.

A second general approach is to use a combination of biological, chemical, and physical assessment measures to demonstrate that the waterbody is meeting its designated uses or to demonstrate that the waterbody is not meeting its designated use due to factors unrelated to nutrients<sup>7</sup> (e.g., mercury). The entity can then propose concentrations of TN, TP, nitrate+nitrite, and/or chlorophyll *a* that reflect baseline conditions protective of the designated use and are calculated from at least three years<sup>8</sup> of data (consecutive if available) as alternative criteria. For lakes and streams, entities can use methods and data similar to those used by EPA to show how the designated use is being met. For example, all of the screening attributes used by EPA for defining the reference sites for streams can be applied to the data from an individual stream. Entities can also use alternate methods to show healthy conditions.

A third general approach provides for entities to use other scientifically defensible approaches to modify TN, TP, nitrate+nitrite, and/or chlorophyll *a*. For example, entities can use several approaches to develop a new chlorophyll *a* response value for lakes that reflects a site-specific or regionally-specific attainment of applicable designated uses, and then define TN and/or TP values based on the new chlorophyll *a* response value. When using this approach, the entity must show how the new chlorophyll *a* value represents attainment of the designated use. For streams, entities can use a number of methods to define a new relationship between a representative stream condition and attainment of the designated uses, which can then be translated into protective TN and TP criteria.

For some waterbodies in Florida, total maximum daily loads (TMDLs) have been developed as a result of the waterbody being listed as impaired. The SSAC proposal can take advantage of the data and analyses performed in the TMDL to support the SSAC submission. For example, a TMDL that used mechanistic modeling to establish the relationship among TN, TP, and chlorophyll *a* in a lake could augment a lake SSAC under the other scientifically defensible methods approach described above. Additional considerations for TMDLs in the SSAC process are presented in section V.

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<sup>7</sup> For waterbodies not meeting their designated uses due to factors unrelated to nutrients, SSAC for nutrients must allow for attainment of the designated use when the non-nutrient factor is corrected.

<sup>8</sup> Three consecutive years should incorporate the most recently available data. However, if a different time period is utilized due to data availability, an explanation should be provided as to why data older than the most recent three consecutive years is appropriate.

### B. Fact Sheet to Accompany the Proposed SSAC

Each submission should have a “fact sheet” in addition to the required supporting documentation. An example fact sheet is included as Figure 3, but in general the following information should be included:

- Location (e.g., county name, specific identifying location information, current waterbody identification or WBID<sup>9</sup>, maps).
- For each waterbody or segment, identification of the applicable numeric nutrient criteria and the recommended numeric nutrient criteria proposed as an alternative.
- Identification of approach(es) used.
- Synopsis describing how the proposed SSAC would be fully protective of the applicable designated use(s) and based on a sound scientific rationale.
- Administrative history - Any assessment, 303(d) list, TMDL history, other prior interpretation of the narrative nutrient criteria, and/or previous permitting decisions/actions to document nutrient relevant history at the location. Note that an entity can submit a proposed SSAC for a waterbody that is or has been on the 303(d) impaired waters list, as long as the entity demonstrates that the proposed SSAC are protective of the designated use of the waterbody.
- Identification of any downstream waters that might be affected by the proposed SSAC.

**Figure 3. Example of "fact sheet" to include with a submittal**

<b>Fact Sheet: Proposed SSAC for Wet Creek</b>	
Location Information	<p>Located in Clear Water State Park (Greene County, Florida)</p> <p>SSAC will apply to Wet Creek from its headwaters to River Mile 8.5 (Lat-Long info)</p> <p>Currently WBID 7000</p> <p>Map enclosed</p>
Numeric Nutrient Criteria Comparison	<p>Wet Creek is located in the Panhandle West NWR.</p> <p>Currently applicable criteria are: TP=0.06 mg/L , TN=0.67mg/L</p> <p>SSAC proposed only for TP. No change proposed for TN of 0.67mg/L.</p>

<sup>9</sup> WBIDs are mentioned here for informational purposes. For purposes of delineating the extent of the location or area for which a SSAC is being requested, identification information such as specific watershed or tributary locations at the upstream and downstream reaches of the area should be used to describe the spatial extent.

	Proposed TP SSAC: TP= 0.1 mg/L
Approach Used to Develop SSAC	Replicating EPA's methodology for streams
Synopsis of Protection of Designated Use	<i>See section IV for additional details on how to document use protection. Only a synopsis of this information is needed for the fact sheet.</i>
History of Assessment	This waterbody is in Group 1 and has been determined to be fully supporting its uses (for all water quality parameters) in the last 3 reporting cycles. Therefore it has never been listed as impaired nor had a TMDL completed.
Identification of Downstream Waters	Wet Creek flows into Wet Lake at River Mile 8.5. There are no streams that flow from Wet Lake.

### C. Data Requirements

Entities submitting SSAC should document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to Appendix A, which discusses the *Technical Support Document for U.S. EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters* (USEPA 2010), data quality elements used by the Florida Department of Environmental Protection, and other details on data sufficiency and quality requirements. The appendix provides information that entities should use to evaluate existing data to determine if it is sufficient to develop SSAC. Appendix A also provides information that entities should use to plan field sampling and analyses in accordance with applicable requirements to ensure that the data collected will be of sufficient quality to develop SSAC. Examples of these considerations include:

- Age and quantity of data.
- Data limits to be evaluated (e.g., pH values > 14).
- Method detection limit considerations.
- Use of approved field methods.
- Analytical laboratory certifications.
- Sampling and analysis plans.
- Data validation considerations (e.g., holding time considerations, analytical data qualifiers, contamination problems).

Florida and EPA resources that are described in the data quality considerations for developing SSAC include the following:

- Florida's Quality Assurance Rule 62-160, F.A.C.
- Florida Department of Environmental Protection's (FDEP's) *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07).
- Section 2.2.2 of the *Technical Support Document for U.S. EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters* (USEPA 2010).
- Florida's Impaired Waters Rule (IWR), 62-303, F.A.C.
- FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02).

EPA's intention is to make this information on how to develop SSAC for lakes and streams easily accessible and to illustrate what information should be documented in a SSAC proposal. The goal is not to require any additional burden for data quality on an entity beyond what EPA utilized in its own criteria development effort. All of the data quality consideration information included in Appendix A may not apply in every case. Lastly, the purpose for including these details is to provide entities with an idea regarding the types of data quality considerations that are already established by the State of Florida in its water quality standards program.

#### *D. Downstream Protection Requirements*

The SSAC proposal must demonstrate that the alternative criteria will ensure the attainment and maintenance of water quality standards of downstream waters, pursuant to 40 CFR 131.10(b). One potential way to do this is to compare the proposed SSAC to the criteria of downstream waters and explain how the downstream criteria will be met, especially if a downstream criterion is a lower concentration than the proposed SSAC.

Streams that flow into lakes are subject to both an instream protection value (IPV) to protect the designated uses of the stream and a downstream protection value (DPV) to protect the designated uses of the downstream lake. An entity proposing a SSAC to replace only the IPV for a stream that flows into a lake should provide a statement that the DPV remains applicable to the stream; that statement is sufficient to document how the SSAC is meeting the downstream protection requirement. In that circumstance, the effective criterion for the stream will be whichever is more stringent of the SSAC and the downstream protection value.

For SSAC that propose to adjust DPVs of streams that flow into lakes, EPA provides a flexible approach for calculating DPVs. If neither EPA nor the state has derived DPVs for the stream pursuant to 40 CFR 131.43(cc)(2)(ii)(B) when the SSAC is proposed, then the applicable DPV depends on the attainment status of the downstream lake. If the lake is attaining the chlorophyll *a*, TN and TP criteria, then the DPVs are the ambient instream levels of TN and TP at

the point of entry to the lake. If the lake is not attaining the criteria or has not been assessed, then the DPVs are the TN and TP criteria for the downstream lake. Alternatively, DPVs can be calculated using one of the following methods:

- Use U.S. Army Corps of Engineers' BATHTUB model when there is sufficient data and information available. It is appropriate for simplified downstream protection value calculations.
- Use other scientifically defensible models (e.g., WASP) that might provide additional capabilities, such as simulating water quality responses to natural and manmade pollutant inputs.

An entity proposing SSAC that adjusts a DPV should provide the data and/or analyses performed to calculate the DPV.

Streams that do not flow into a lake will presumably flow into another waterbody, such as another stream segment or stream reach, a river, a spring, and eventually to an estuary or coastal water. In the case of a stream flowing into a downstream segment, reach, river or spring, the entity must demonstrate that the proposed SSAC allows for the attainment and maintenance of the water quality standard in that downstream segment or reach, especially if there is evidence suggesting that the downstream water is more sensitive than the stream for which the SSAC is being proposed. Likewise, the entity must demonstrate that the SSAC allows for the attainment and maintenance of water quality standards in any receiving estuary or coastal waters. Until the numeric nutrient criteria for estuaries and coastal waters are established, the SSAC must provide for the attainment and maintenance of the narrative criteria applicable to those waters. After the numeric nutrient criteria for estuaries and marine coastal waters are established, those numeric criteria will be an interpretation of the narrative criteria.

The submittal of proposed SSAC for a lake must include a review and analysis of applicable downstream TN and TP criteria to confirm that a proposed SSAC for a lake will meet the instream protection value (found in 40 CFR 131.43(c)(2)(i)) of any stream leaving the lake.

#### *E. Developing Site-Specific Alternative Criteria for Lakes*

This subsection describes three general approaches for developing SSACs for lakes<sup>10</sup>:

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<sup>10</sup> EPA allows a one-time adjustment to lake criteria in accordance with 40 CFR 131.43(c)(1)(ii) without the need for a SSAC. Any subsequent adjustments are only available as SSAC.

1. Applying EPA's methodology while maintaining the applicable chlorophyll *a* values specified in 40 CFR 131.43 and deriving alternative TN and/or TP values based on local conditions.
2. Using site-specific biological, chemical, and physical data to demonstrate that the waterbody is meeting its designated uses or to demonstrate that the waterbody is not meeting its designated uses due to factors unrelated to nutrients and then using baseline conditions of TN, TP, and/or chlorophyll *a* levels as alternative criteria.
3. Using other scientifically defensible methods to derive chlorophyll *a*, TN, and/or TP values that can be shown to be protective of the designated use(s).

For all proposed alternative lake values, the SSAC submission must include a review and analysis of applicable downstream TN and TP criteria to confirm that the alternative lake values will meet the instream protection value (IPV) of any stream leaving the lake. Demonstration of downstream protection should be consistent with the approaches that EPA provided in 40 CFR 131.43(c)(2)(ii), unless another scientifically defensible method is appropriate.

#### 1. Replicating EPA's Methodology for Lakes

This approach involves replicating EPA's method of deriving lake criteria to adjust the federally promulgated TN and/or TP criteria to values *outside* of the range defined in the modification provision at 40 CFR 131.43(c)(1)(ii) while maintaining the promulgated chlorophyll *a* criterion. Under this process, a lake with a proposed SSAC would remain in the same class based on color and alkalinity as defined in 40 CFR 131.43, and keep the associated chlorophyll *a* value.

First, identify the appropriate lake classification and corresponding chlorophyll *a* criterion for the lake:

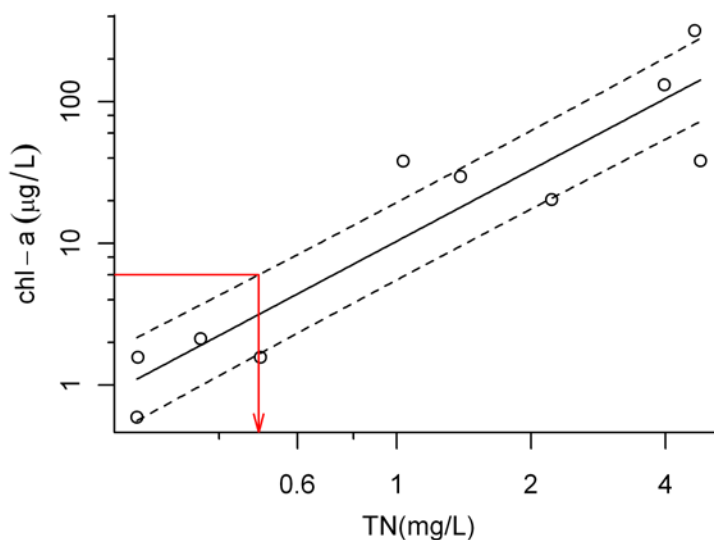
- Colored lakes (color > 40 platinum cobalt units (PCU)) – 20 µg/L chlorophyll *a*
- Clear lakes (color ≤ 40 PCU) with high alkalinity (alkalinity > 20 mg/L as CaCO<sub>3</sub>) – 20 µg/L chlorophyll *a*
- Clear lakes (color ≤ 40 PCU) with low alkalinity (alkalinity ≤ 20 mg/L as CaCO<sub>3</sub>) – 6 µg/L chlorophyll *a*

Next, establish a new stressor-response (empirical) relationship between chlorophyll *a* and TN and/or TP by using linear regression to relate TN/TP with chlorophyll *a* (see Figure 4 for an example). Identify the TN/TP concentration associated with the chlorophyll *a* criterion identified in the first step (i.e., where the chlorophyll *a* value intersects with the 75<sup>th</sup> percentile of predicted distribution of chlorophyll *a* values). This nutrient concentration becomes the

proposed SSAC. The red line in Figure 4 shows the derivation of TN corresponding to 6  $\mu\text{g/L}$  of chlorophyll  $a$ .

**Figure 4. Example of site-specific nutrient stressor-response relationship.**

Solid line: mean relationship, dashed lines: 25th and 75th percentiles of the predicted distribution of chlorophyll  $a$  values.



The new empirical relationship should be based on at least ten pairs of data<sup>11</sup>. Each data pair represents the annual average TN or TP and chlorophyll  $a$  for a particular lake or sampling location. Data used to compute annual averages should be collected over the course of the year to capture seasonal differences. When collecting data for multiple parameters, EPA prefers that the data for all of the parameters be collected concurrently, but at a minimum within a four-day period. The strength of the scientific defensibility of the SSAC increases with the number of data pairs and when the data points for each of the data pairs are collected close together in time. Moreover, the data should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis (refer to EPA's *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* (EPA-822-B-00-001) for examples of sampling recommendations).

The precision of the estimated relationships between nutrient concentrations and chlorophyll  $a$  should be evaluated by considering the range of candidate criterion values associated with different percentiles of the predicted distribution<sup>12</sup>. Relationships in which the

<sup>11</sup> Accurately estimating an empirical relationship between a stressor and a response requires at least 10 samples (Harrell FE, 2001. *Regression Modeling Strategies*. Springer-Verlag, Inc., New York, NY). Calculating 10 annual averages of TN or TP and chlorophyll  $a$  may be achievable by using long-term monitoring data or by combining data from nearby, similar lakes.

<sup>12</sup> See US EPA, 2010. *Using Stressor-response Relationships to Derive Numeric Nutrient Criteria*. EPA-820-S-10-001. Office of Water, U.S. Environmental Protection Agency, pp.38-39.

criterion associated with the 25<sup>th</sup> percentile of the predicted relationship differs substantially from the criteria associated with higher percentiles may be too imprecise to usefully inform criterion decisions.

Document all methods and assumptions associated with data collection, analysis, and SSAC derivation. Refer to section A.1 of Appendix A, which discusses the *Technical Support Document for U.S. EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters* (USEPA 2010), Florida's Impaired Waters Rule (62-303 F.A.C.), Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), and other details on data sufficiency and quality requirements.

## 2. Using Site-Specific Biological, Chemical, and Physical Data

Using this approach, first assemble a data set that includes biological, chemical, and physical data to show how the lake is presently attaining its designated use(s). Data should include at least three years of the most recent data (consecutive years where available). Calculate an annual average for each biological, chemical, and physical parameter, when applicable; these should include TN, TP, and chlorophyll *a* for a particular lake or sampling location. The data for computing the annual averages should be collected over the course of the year to capture seasonal differences, and should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis. Refer to EPA's *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* (EPA-822-B-00-001) for examples of sampling recommendations. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section A.2 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), and other details on data sufficiency and quality requirements.

Supporting physical, chemical and biological data may include the following:

- Historical quantitative water quality data (e.g., TN, TP, chlorophyll *a*, dissolved oxygen, clarity/turbidity, temperature, average depth).
- Qualitative information (e.g., long term observations of water for the presence of algal mats or fish kills, surrounding land uses).
- Presence of balanced native flora and fauna.
- Consideration of the range of diel fluctuations in dissolved oxygen (DO).
- Consideration of current and historical conditions to ensure full support of designated uses and consistency when comparing temporal data.

Here is an example of a data set that includes physical, chemical and biological parameters to support a demonstration of how a lake presently meets designated uses:

- Chemical water quality data including at least three consecutive years of DO, chlorophyll *a*, TN, and TP data.
- 2 Lake Vegetation Index (LVI) calculations (LVIs must both be > 46; assuming 2 samples from at least 3 consecutive years).
- Habitat assessment (including presence/absence of native flora and fauna).

Finally, propose the alternative numeric criteria (e.g., TN, TP, and/or chlorophyll *a*) based on concentrations that reflect baseline conditions calculated from at least three years of the most recent data (consecutive years where available) with a justification for the adjustment and explain how the changes will ensure maintaining the designated uses.

### 3. Using Other Scientifically Defensible Methods

EPA recognizes that there may be other scientifically defensible methods that can be used to develop an alternative chlorophyll *a* endpoint that is protective of designated uses and then relate TN and TP concentrations in one or more lakes to the alternative endpoint. The following are general examples using stressor-response, mechanistic modeling, and reference-based approaches.

#### *a. Stressor-Response Approach*

First, determine an alternative chlorophyll *a* response endpoint (i.e., different from those in 40 CFR 131.43), and clearly demonstrate how this response endpoint supports the protection of the designated use(s) of the lake using site-specific data. Then, determine the stressor-response (empirical) relationship<sup>13</sup> between the new chlorophyll *a* response endpoint and TN and TP. Data may include the following:

- Long-term data set (at least three years of the most recent data (consecutive years where available)) that includes the alternate chlorophyll *a* endpoint, TN, TP, and any other relevant data.
- Alternative scientifically defensible trophic status metric.

For relating the new chlorophyll *a* endpoint to TN and/or TP for a lake, the new empirical relationship should be based on at least three years of the most recent data (consecutive years where available). For statistical robustness, however, at least ten pairs of

<sup>13</sup> U.S. EPA 2010. Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria. EPA-820-S-10-001. U.S. Environmental Protection Agency, Office of Water, Washington DC.

data<sup>14</sup>, in which each data pair represents the annual average TN or TP and chlorophyll *a* for a particular lake or sampling location, are preferable if such data are available. Data used to compute annual averages should be collected over the course of the year to capture seasonal differences. Data should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis; refer to EPA's *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* for examples of sampling recommendations. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section A.3 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02) and other details on data sufficiency and quality requirements.

Next, use statistical techniques, such as linear or multivariate regression, to relate TN and TP with chlorophyll *a*. Evaluate whether the accuracy and precision of the estimated stressor-response relationship<sup>15</sup> are sufficient to inform nutrient criteria derivation. Finally, pick the point at which the prediction interval value of chlorophyll *a* is equivalent to the new chlorophyll *a* criterion as the new TN and/or TP criterion, and justify the use of the point selected in the distribution (e.g., the 75<sup>th</sup> percentile). Then, translate this chlorophyll *a* value to the new TN and TP criterion. Justify and use valid stressor-response analysis to derive TN and TP based on the alternate chlorophyll *a* value.

#### *b. Mechanistic Modeling*

Well-calibrated environmental water quality or ecosystem models can be used to identify potential thresholds of biological and ecosystem responses and the associated level of nutrient inputs, and may be applicable to developing SSAC. In contrast to regression approaches that rely on empirical statistical analysis, mechanistic (or process-based) models more explicitly simulate the ecological processes that are operating in a given waterbody, and this may provide a greater ability to discern the reasons behind the observed biological responses. Mechanistic models can also examine proposed numeric nutrient criteria under a range of conditions to predict a system's response as an additional confirmatory step for a stressor-response relationship.

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<sup>14</sup> Accurately estimating an empirical relationship between a stressor and a response requires at least 10 samples (Harrell FE, 2001. *Regression Modeling Strategies*. Springer-Verlag, Inc., New York, NY). Calculating ten annual averages of TN or TP and chlorophyll *a* may be achievable by using long-term monitoring data available in some lakes or by combining data from nearby, similar lakes.

<sup>15</sup> U.S. EPA 2010. *Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria*. EPA-820-S-10-001. U.S. Environmental Protection Agency, Office of Water, Washington DC.

Any model proposed for SSAC development should simulate nutrient processes and algal responses (e.g., phytoplankton in lakes). If possible, the model should account for the effects of confounding variables (e.g., suspended sediment, shading, flow, grazers).

Identify a sound scientific model<sup>16</sup> and justify why this model was chosen. Describe which biological, chemical, and/or physical characteristics were simulated, which endpoints were chosen, and how those endpoints are related to designated use protection. The description should also include:

- Ecological processes captured by the model.
- Time variable versus steady state.
- Primary simplifying assumptions.
- Metrics/endpoints that are able to be calculated from model output.

Entities should be prepared to provide the model software, its supporting documentation, and/or model runs for review, if EPA requests.

Document the important or sensitive model parameters and their sources. Document the sources of the driving data and the quality assurance procedures for the data collection. Data should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis; refer to EPA's *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* for examples of sampling recommendations. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section A.3 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02) and other details on data sufficiency and quality requirements.

Provide a description of the modeled site. If the model does not simulate the entire waterbody, then describe how it can be considered a representative site, or that it was applied in enough sites to capture spatial heterogeneity. Use site-specific data for driving variables, if available. If the values are not direct measurements, indicate how the values were derived (e.g., flow data extrapolated from an upstream gage, time series, total suspended solids [TSS] data derived from a regression against flow).

Document the model calibration procedures along with a description of model performance (i.e., how well calibrated the model output was to the calibration endpoints). Also describe which verification and/or validation procedures were undertaken, and their results.

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<sup>16</sup> For example, use the TMDL compendium on models: U.S. EPA 1997. Compendium of Tools for Watershed Assessment and TMDL Development. EPA 841-B-97-006.

The model simulation should be run for existing conditions as well as the proposed nutrient regime to demonstrate that designated uses would be protected by the proposed SSAC. If it is a dynamic (time-variable) model, the simulation time period should include important variability (e.g., high-flow and low-flow years).

### *c. Reference Condition Approach*

Identify a group of lakes (or observations within a lake) with similar, naturally expected conditions to each other taking into consideration regional variability<sup>17</sup>. Screen sites/observations to identify the subset of reference lakes that is minimally impacted/least disturbed. Describe the data quality screening methodology used and show how it results in a set of reference conditions that are minimally impacted/least disturbed.

Demonstrate that adequate data are available to pursue this methodology. The data should include at least three years of the most recent data (consecutive years where available) for each of the biological, chemical, and physical parameters used in developing the reference condition, and include TN, TP, and chlorophyll *a* for a particular lake or sampling location. Data should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis (refer to EPA's *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* for examples of sampling recommendations).

Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section A.3 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02), and other details on data sufficiency and quality requirements.

Determine how many reference sites and observations are needed to represent natural variability of the lakes in the analysis, and then justify the number of reference sites selected (refer to EPA's *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs*). Develop a distribution for chlorophyll *a*, TN and TP from the reference sites. Select and justify the appropriate percentile for deriving the alternative numeric nutrient criteria for TN, TP and/or chlorophyll *a* based on available data and document how the set of reference sites meets the designated uses.

### *F. Developing Site-Specific Alternative Criteria for Streams*

This subsection describes three general approaches for developing SSAC for streams:

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<sup>17</sup> U.S. EPA 2000. Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs. EPA-822-B-00-001. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

1. Applying EPA's methodology by using a set of reference conditions (i.e., a subset of reference sites from EPA's sites or a combination of EPA sites and additional sites).
2. Using site-specific biological, chemical, and physical data to show that a specific stream or watershed is meeting the designated stream uses.
3. Using other scientifically defensible methods to derive TN and TP values that can be shown to be protective of the designated uses.

In all cases, explain and demonstrate how the proposed alternative stream TN and TP values continue to provide for the attainment and maintenance of the water quality standards of downstream waters. For SSAC stream segments with downstream lakes, a statement that a SSAC seeks to adjust only the IPV for a stream while the DPV remains applicable is sufficient for this purpose. Where the SSAC seeks to adjust both the stream IPV and DPV, use the methodology described in 40 CFR 131.43(c)(2)(ii) and in section IV.D. For SSAC stream segments with downstream streams/rivers/canals, if the proposed alternative TN and/or TP criteria are less than or equal to the instream protective value (IPV) for the downstream stream segment, then the site-specific stream criteria meet the test for downstream protection. Otherwise, if the proposed SSAC stream criteria are greater than the IPV for the downstream stream segment, then the SSAC submission must include the analysis and data to demonstrate how the proposed alternative site-specific stream criteria will assure that the downstream IPV is met.

#### 1. Replicating EPA's Methodology for Streams

For streams, entities can use the EPA's reference-based methodology to define a sub-region within one of EPA's nutrient watershed regions and then (a) develop a subset of reference sites from the set of regional reference sites used by EPA or (b) develop a set of reference sites consisting of a combination of a subset of EPA's regional reference sites and additional sites that pass the EPA reference site screening methodology to establish alternative TN and/or TP values. The entity should use all reference sites in the sub-region.

First, identify the sub-region for which a refined TN and/or TP value is desired. If using the EPA set of reference sites, identify the subset of reference sites within the sub-region. If additional reference sites are being included, screen sites/observations, based on screening criteria identified in EPA's final rule, to identify the reference site set that is minimally impacted/least disturbed. Document that the reference sites are minimally impacted/least disturbed.

Demonstrate that adequate data are available to pursue this methodology. The data should include at least three years of the most recent data (consecutive years where available).

Each sample set of TN, TP, Stream Condition Index (SCI) and chlorophyll *a*<sup>18</sup> should be independent and representative of the conditions for which the annual average for each of the biological, chemical, and physical parameters could be calculated. Data should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis. Refer to EPA's *Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (EPA-822-B-00-002) for examples of sampling recommendations. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section B.1 of Appendix A, which discusses the *Technical Support Document for U.S. EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters* (USEPA 2010), Florida's Quality Assurance Rule (62-160 F.A.C), and other details on data sufficiency and quality requirements.

Determine the number of reference sites and observations that are adequate to represent natural variability. Develop a distribution of TN and/or TP using the reference sites, and select a percentile of the resulting distribution of reference sites for TN and/or TP. To replicate EPA's methodology for streams, use the 75<sup>th</sup> percentile for the SCI sites in the West Central region and use the 90<sup>th</sup> percentile for reference sites elsewhere in the state when deriving the alternative criteria.

## 2. Using Site-Specific Biological, Chemical, and Physical Data

Using this approach, first assemble a data set that includes biological, chemical, and physical data to show how the stream segment is presently meeting its designated use(s). Data should include at least three years of the most recent data (consecutive years where available). Calculate an annual average for each year for each of the biological, chemical, and physical parameters, if applicable; these should include TN and TP for a particular stream or sampling location. Data for computing annual averages should be collected over the course of the year to capture seasonal differences and should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis. Refer to EPA's *Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (EPA-822-B-00-002) for examples of sampling recommendations. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section B.2 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02), and other details on data sufficiency and quality requirements.

Supporting physical, chemical and biological data may include the following:

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<sup>18</sup> Chlorophyll *a* and SCI provide pertinent information on the condition of the waterbody, although they were not parameters included as stream criteria under this rule or subject to the alternative criteria derivation of this rule.

- Historical quantitative water quality data (e.g., TN, TP, chlorophyll *a*, dissolved oxygen (DO), total suspended solids, clarity, temperature, depth, flow rates).
- Qualitative information (e.g., long term observations of water for the presence of algal mats or fish kills, riparian habitat).
- Presence of balanced native flora and fauna.
- Stream Condition Index > 40 or other valid metric for streams and other flowing waters.
- Consideration of the range of diel fluctuations in dissolved oxygen.

Consideration of current and historical conditions to ensure full support of designated uses and consistency when comparing temporal data.

Here is an example of a data set that includes physical, chemical and biological parameters to support a demonstration of how a stream presently meets designated uses:

- Chemical water quality data including at least three consecutive years of DO, TN and TP data.
- 3 Stream Condition Index (SCI) samples (SCIs > 40; based on one or more samples from each of 3 consecutive years).
- Information on hydrologic disturbance/channelization.
- Landscape Development Intensity (LDI) score of  $\leq 2$  in the 100 m wide by 10 km upstream corridor and  $\leq 3$  within the watershed.
- Habitat assessment (including presence/absence of native flora and fauna).

Finally, propose the alternative numeric criteria (e.g., TN, TP, and/or chlorophyll *a*) based on concentrations that reflect baseline conditions calculated from at least three years of the most recent data (consecutive years where available) with a justification for the adjustment and explain how the changes will ensure maintaining the designated uses.

### 3. Using Other Scientifically Defensible Methods

EPA recognizes that there may be other scientifically defensible methods that can be used to develop alternative TN and TP concentrations for streams that are protective of designated uses. Stressor-response, reference, and mechanistic modeling approaches are described here as examples.

#### *a. Stressor-Response Approach*

Develop one or more response endpoints (e.g., chlorophyll *a*, periphyton, or metric/index) with links to nutrients that show that the stream designated uses are being met. First, determine the response endpoint using an empirical relationship that is scientifically justified by site-specific data. The alternative endpoint(s) must meet all existing Florida water

quality standards. Then, determine the stressor-response relationship<sup>19</sup> between the new response endpoint and TN and TP. Provide data to justify using the alternate endpoint value (i.e., how it protects designated use) and how the alternate TN and TP values were derived. Data may include:

- Long-term data set (at least three years of the most recent data (consecutive years where available)) that includes the alternate endpoint, TN, TP, and any other relevant data.
- Alternative scientifically defensible trophic status metric appropriate for this waterbody type.

Data should include at least three years of the most recent data (consecutive years where available). For statistical robustness, however, at least ten samples<sup>20</sup> are preferable if such data are available. Calculate an annual average for each year for each of the biological, chemical, and physical parameters used in developing the stressor-response relationship; these should include TN and TP for a particular stream or sampling location. Data used to compute annual averages should be collected over the course of the year to capture seasonal differences. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section B.3 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02), and other details on data sufficiency and quality requirements.

Establish the relationship between the long-term data and/or trophic status metric and the endpoint in the SSAC stream(s). Use statistical techniques, such as linear or multivariate regression, to relate TN and TP with the response endpoint. Evaluate whether the accuracy and precision of the estimated stressor-response relationship<sup>21</sup> is sufficient to inform nutrient criteria derivation. Identify the point in the predicted distribution of the endpoint values that is equivalent to the desired endpoint threshold. Justify the use of the point selected in the distribution (e.g., the 75<sup>th</sup> percentile, see Figure 4). Then translate this endpoint value to the new TN/TP criterion. Justify and use valid stressor-response analysis to derive TN and TP based on the alternate endpoint value.

<sup>19</sup> U.S. EPA 2010. Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria. EPA-820-S-10-001. U.S. Environmental Protection Agency, Office of Water, Washington DC

<sup>20</sup> Accurately estimating an empirical relationship between a stressor and a response requires at least 10 samples (Harrell FE, 2001. Regression Modeling Strategies. Springer-Verlag, Inc., New York, NY). Calculating ten annual averages of TN or TP and chlorophyll *a* may be achievable by using long-term monitoring data available in some streams or by combining data from nearby, similar streams.

<sup>21</sup> U.S. EPA 2010. Using Stressor-Response Relationships to Derive Numeric Nutrient Criteria. EPA-820-S-10-001. U.S. Environmental Protection Agency, Office of Water, Washington DC.

### *b. Reference Condition Approach*

For streams, entities can develop reference sites that differ from those developed using EPA's reference-based methodology. For example, the entity could define a sub-region within one of EPA's nutrient watershed regions and then (a) develop a set of reference sites using a different screening methodology than that used by EPA or (b) develop a set of reference sites from outside of the region in which the SSAC stream segments are located. In all cases, if a new screening methodology is developed, document how the new screening methodology ensures that the reference sites represent minimally impacted/least disturbed conditions.

First, identify the sub-region for which a refined TN and/or TP value is desired. Show how the streams in this sub-region are similar. If using any of EPA's set of reference sites, identify the subset of reference sites. If additional reference sites are being included, screen sites/observations based on the desired screening criteria (either EPA's or a newly developed, scientifically defensible one), to identify the reference site set that is minimally impacted/least disturbed.

Next, demonstrate that adequate data are available to support this methodology. The data should include at least three years of the most recent data (consecutive years where available). Calculate an annual average for each year for each of the biological, chemical, and physical parameters used in developing the reference condition; these should include TN and TP for a particular stream or sampling location. Data should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis. Refer to EPA's *Nutrient Criteria Technical Guidance Manual: Rivers and Streams* (EPA-822-B-00-002) for examples of sampling recommendations. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section B.3 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02), and other details on data sufficiency and quality requirements.

Determine the number of reference sites and observations that are adequate to represent natural variability. Develop a distribution of TN and TP using the reference sites, and select a percentile of the resulting distribution of reference sites. Derive the alternative criteria using that percentile, and justify the selection of the percentile based on the available data.

### *c. Mechanistic Models*

Well-calibrated environmental water quality or ecosystem models can be used to identify potential thresholds of biological and ecosystem responses and the associated level of nutrient inputs, and may be applicable to developing SSAC. In contrast to regression

approaches that rely on empirical statistical analysis, mechanistic (or process-based) models more explicitly simulate the ecological processes that are operating in a given waterbody, and this may provide a greater ability to discern the reasons behind the observed biological responses. Mechanistic models can also examine proposed numeric nutrient criteria under a range of conditions to predict a system's response as an additional confirmatory step for a stressor-response relationship.

Any model proposed for SSAC development should simulate nutrient processes and appropriate response endpoints (e.g., periphyton, dissolved oxygen, or metric/index) for the stream segment. The response endpoint(s) should have an established link to nutrients and reflect protection of the designated use. The endpoint(s) must meet existing Florida water quality standards for that parameter. If possible, the model should account for the effects of confounding variables (e.g., suspended sediment, shading, flow, grazers).

Identify a sound scientific model<sup>22</sup> and justify why this model was chosen. Describe which biological, chemical, and/or physical characteristics were simulated, which endpoints were chosen, and how those endpoints are related to designated use protection. The description should also include:

- Ecological processes captured by the model.
- Time variable versus steady state.
- Primary simplifying assumptions.
- Metrics/endpoints that are able to be calculated from model output.

Entities should be prepared to provide the model software, its supporting documentation, and/or model runs for review, if EPA requests.

Document the important or sensitive model parameters and their sources. Document the sources of the driving data and the quality assurance procedures for the data collection. Data should be collected at locations within the waterbodies to represent the variability of waterbodies used in the analysis; refer to EPA's *Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs* for examples of sampling recommendations. Document all methods and assumptions associated with data collection, analysis and SSAC derivation. Refer to section B.3 of Appendix A, which discusses Florida's Quality Assurance Rule (62-160 F.A.C), FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07), FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02) and other details on data sufficiency and quality requirements.

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<sup>22</sup> For example, use the TMDL compendium on models: U.S. EPA 1997. Compendium of Tools for Watershed Assessment and TMDL Development. EPA 841-B-97-006.

Provide a description of the modeled site. If the model does not simulate the entire waterbody, then describe how it can be considered a representative site, or that it was applied in enough sites to capture spatial heterogeneity. Use site-specific data for driving variables, if available. If the values are not direct measurements, indicate how the values were derived (e.g., flow data extrapolated from an upstream gage, time series TSS data derived from a regression against flow).

Document the model calibration procedures along with a description of model performance (i.e., how well calibrated the model output was to the calibration endpoints). Also describe which verification and/or validation procedures were undertaken, and their results.

The model simulation should be run for existing conditions as well as the proposed nutrient regime to demonstrate that designated uses would be protected by the proposed SSAC. If it is a dynamic (time-variable) model, the simulation time period should include important variability (e.g., high-flow and low-flow years).

## **V. Considerations for Using Loads and TMDL Targets when Deriving Proposed SSAC**

### *A. Use of Concentration-Based Criteria and Supplemental Load Information*

EPA established the TN and TP criteria in 40 CFR 131.43(c) as concentrations based on several factors. The ability to monitor and assess concentrations of TN and TP is a function of direct measures of the nitrogen and phosphorus constituents in a waterbody. This gives all interested parties, including water quality managers and the public, numeric values of nutrients that are easy to understand and use. In contrast, the ability to assess loads in a receiving waterbody requires the measurement of concentrations of all nitrogen and phosphorus constituents from each source (including sources such as urban and agricultural runoff and atmospheric deposition) and the associated flows from these sources. In addition, loads are often an estimated measurement due to the necessity of estimating concentrations from the various sources (in particular intermittent ones) and associated flows.

When EPA developed the criteria as concentrations, EPA also considered the ecological response of the effects of excess nutrients. For algal growth, the concentration of nutrients combined with favorable growing conditions results in algal production. Because loads of TN and TP can be delivered to a waterbody over varying time periods, the resulting concentration of TN and TP can vary as well. For example, a large load delivered over a short period of time will most likely result in a higher concentration than the same load delivered over a long period of time. Loads to waterbodies over time tend to integrate some of the fluctuations in nutrient inputs from various sources.

EPA recognizes how these criteria affect implementation of other Clean Water Act programs, such as the relationship of the TMDL program to point and nonpoint source discharges, and is allowing entities to also submit a supplemental load that is consistent with the proposed SSAC concentration. While the results of a TMDL are load and wasteload allocations to nonpoint and point sources, the basis for the TMDL target is ultimately a concentration of nutrients in a receiving waterbody. EPA's requirement that SSAC be expressed as concentrations, with or without optional supplemental loads, does not undermine existing or past TMDLs, NPDES permits, or other CWA actions that have load-based requirements. Additional information on TMDLs and NPDES permits is in subsections B and C.

*B. Considerations for Using TMDL Targets When Deriving Proposed SSAC*

A total maximum daily load (TMDL) establishes the maximum amount of a particular pollutant that a particular waterbody may receive while still meeting water quality criteria. TMDLs are based upon the best available data and information at the time that they are written to ensure that the waterbody will meet and continue to meet the water quality standards for the pollutant. The principles, data requirements and types of analyses needed for the development of TMDLs can be similar to those necessary for SSAC development. In this section, EPA provides some general guidelines for proposing a SSAC based on work underlying a previously established TMDL.

In order to use data and analyses developed for TMDLs in support of a proposed SSAC, the following questions should be addressed in the documentation supporting the SSAC:

- Do the data and analyses support the conclusion that the SSAC protects the designated use (i.e., translates the narrative nutrient criterion) in the subject water, based upon the most current available information?
- Is there adequate supporting documentation to demonstrate protection of the designated use?
- Does the SSAC ensure adequate protection of downstream water quality standards?

Regarding the question of designated use protection, there should be information on the following:

- How the conclusions indicate values that are protective of balanced natural populations of aquatic flora and fauna.
- What the initial assumptions were and whether the assumptions are still valid.
- What was being demonstrated at the time the TMDL was written.
- Whether the target was derived – directly or indirectly – from an impairment threshold.

Any new data about the system should be considered. If the TMDL did not address downstream effects, delay in the response to nutrient inputs, then those effects must be addressed.

EPA recommends that entities follow the expectations outlined in section IV in addition to those in this section in order to demonstrate that the proposed SSAC are fully protective of the designated use(s).

### *C. SSAC, Existing TMDLs and Resultant NPDES Permit Limits*

EPA finds that a reasonable way to move forward with reducing nutrient pollution is to presume that existing TMDLs and wasteload allocations are an appropriate basis on which to establish NPDES permit limits in the next round of permits after EPA established the standards in 40 CFR 131.43. Because the nutrient TMDLs that were existing when EPA published the final rule were established to protect Florida's waters from the effects of nitrogen and phosphorus pollution, the same goal as EPA's numeric nutrient criteria, the Agency finds that, absent specific new information to the contrary, it is reasonable to presume that basing NPDES permit limits on those TMDLs will result in effluent limitations as stringent as necessary to meet the federal numeric nutrient criteria. Therefore, in carrying out its permit review oversight responsibilities, EPA intends to exercise its discretion by presuming that NPDES permits proposed by FDEP that implement wasteload allocations in current TMDLs will result in effluent limitations that reflect the necessary loading reductions to assure attainment of the new criteria. As new information becomes available in the future or as FDEP examines over time the existing nutrient TMDLs, EPA recognizes that changes may be necessary for some TMDLs and NPDES permits to reflect revised analysis and updated data. However, due to the complexity and/or significance of a TMDL, the state or any other entity may decide that the results of that TMDL should be incorporated into site-specific alternative criteria. In those cases the state or other entity may submit a proposed SSAC to EPA.

## Appendix A. Data Quality

### A. Data Quality Considerations for Developing Site-Specific Alternative Nutrient Criteria for Florida's Lakes

As described in section V.C(1) of the preamble for EPA's final rule, *Water Quality Standards for the State of Florida's Lakes and Flowing Waters*, there are several approaches for developing SSAC for lakes. One approach is to replicate the one that EPA used to develop lake criteria and apply this method to a smaller subset of waters. Another approach is to conduct a biological, chemical, and physical assessment of lake conditions to develop SSAC. A general provision for using another scientifically defensible approach that is protective of the designated use is also provided. A description of the data quality considerations for developing SSAC for these approaches is provided below.

FDEP's *Quality Assurance Rule 62-160*<sup>23</sup> describes the minimum field and laboratory quality assurance (QA), methodological and reporting requirements used to assure that chemical, physical, biological, microbiological, and toxicological data used by FDEP are appropriate and reliable. It applies to all FDEP programs, projects, studies, and other activities that involve the measurement, use, or submission of environmental data or reports to FDEP with the exception of those activities related to air quality and meteorological studies that have no requirements for contamination of soil, water or tissue. Part II (*Field Procedures*) of Rule 62-160 discusses approved field procedures and recordkeeping and reporting requirements for field procedures. Part III (*Laboratory Certification Procedures*) of Rule 62-160 covers laboratory certification, approved laboratory methods, approval of new and alternative laboratory methods, and recordkeeping and reporting requirements for laboratory procedures. Part IV (*Miscellaneous*) discusses sample preservation and holding times, electronic signatures, research field and laboratory procedures, field and laboratory audits, and data validation. In addition to the data verification and validation procedures described in Rule 62-160.670(1) and (2), F.A.C., FDEP evaluates data quality using the data quality indicators described in FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07)<sup>24</sup>.

#### 1. Data Quality Objectives Used in EPA's Approach for Developing Lake Criteria

If an entity chooses to apply EPA's approach for developing lake criteria to a smaller subset of waters, it should use the same data quality objectives used by EPA for developing this approach. As described in section 2.2.2 of the *Technical Support Document for U.S. EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters* (USEPA 2010), EPA downloaded chlorophyll *a* and selected water chemistry data (alkalinity, color, nitrogen species, phosphorus species, pH, dissolved oxygen) from Florida lakes from the Florida *Impaired Waters Rule*

<sup>23</sup> Florida Department of Environmental Protection (FDEP). 2008. Rule 62-160. *Quality Assurance*. Effective 12-3-08.

<sup>24</sup> Florida Department of Environmental Protection (FDEP). 2008. DEP-EA 001/07 *Process for Assessing Data Usability*. Florida Department of Environmental Protection, Bureau of Standards and Special Projects, Environmental Assessment Section.

(IWR), 62-303, F.A.C.<sup>25</sup> database, which comprises all of the STORET data for Florida. The IWR data set includes several years of monitoring data from FDEP and other entities (public and private) in Florida. These data were augmented by FDEP with some of its own data not stored in the IWR database. FDEP queried its own Laboratory Information Management System (LIMS) for QA information not provided in IWR.

### 1.1 Impaired Waters Rule (62-303, Florida Administrative Code)

Florida's STORET database design is dictated by the *Impaired Waters Rule*, 62-303, F.A.C.<sup>26</sup>. This rule establishes a methodology to identify waters that will be included on Florida's verified list of impaired waters based on representative data. The rule covers assessment of aquatic life use support, biological assessment, interpretation of narrative nutrient criteria, primary contact and recreation use support, fish and shellfish consumption use support, drinking water use support and protection of human health.

For example, data sufficiency and quality requirements in section 62-303 include, but are not limited to, the following:

- Data from FDEP's STORET database or its successors should be used as the primary source of data for determining whether samples do not meet water quality criteria.
- In general, data older than 10 years should not be considered representative of current conditions.
- Values that exceed possible physical or chemical measurement constraints (e.g., pH > 14) and data transcription errors will be excluded from the assessment. If statistical procedures are used to identify outliers, FDEP will evaluate these outliers and determine whether they should be considered invalid and not included in the assessment. If the data are excluded, FDEP will note in the record that data were excluded and why they were excluded.
- FDEP will consider all readily available water quality data collected and analyzed in accordance with Chapter 62-160, F.A.C. If requested, the sampling agency must provide to the Department all of the data quality assessment elements listed in Table 2 of the Department's Guidance Document *Data Quality Assessment Elements for Identification of Impaired Surface Waters* (DEP EAS 01-01, April 2001).
- Surface Water data with values below applicable PQLs or MDLs will be assessed in accordance with rules 62-4.246(6)(b)-(d) and (8), F.A.C. If there are no analytical methods with MDLs below a criterion, then the method with the lowest MDL should be used.

<sup>25</sup> Florida Department of Environmental Protection (FDEP). 2007. Chapter 62-303. Identification of *Impaired Surface Waters*. Effective 9-4-07.

<sup>26</sup> Florida Department of Environmental Protection (FDEP). 2007. Chapter 62-303. Identification of *Impaired Surface Waters*. Effective 9-4-07.

## 1.2. Florida's Data Quality Assessment Elements for Identification of Impaired Surface Waters (DEP EAS 01-01)

As described in Florida's *Impaired Waters Rule* (62-303, Florida Administrative Code)<sup>27</sup>, FDEP may request and evaluate all of the data quality assessment elements listed in Table 2 of Florida's *Data Quality Assessment Elements for Identification of Impaired Surface Waters*<sup>28</sup>. This data quality assessment elements document also provides in Table 1, the level of data quality assessment that should be conducted for data used for identifying impaired surface waters. The following recommended quality assessment checks are provided in Table 1 of Florida's *Data Quality Assessment Elements for Identification of Impaired Surface Waters*:

- Review to determine if analyses were conducted within holding times.
- Review for qualifiers indicative of problems.
- Screen comments for keywords indicative of problems.
- Review laboratory certification status for particular analyte at the time analysis was performed.
- Review data to determine if parts are significantly greater than the whole (e.g., ortho-P > total phosphorus, or NH<sub>3</sub> > TKN).
- Screen data for realistic ranges (e.g., is pH < 14?).
- Review detection limits and quantitation limits against Department criteria and program action levels to ensure adequate sensitivity.
- Review for blank contamination.

## 2. Recommended Data Quality Procedures for Conducting a Biological, Chemical, and Physical Assessment of Lake Conditions

### *2.1 Field Activities and Field Measurements*

If an entity wants to conduct a biological, chemical, and physical assessment of lake conditions to support SSAC development, it should follow FDEP's approved Standard Operating Procedures (SOPs) for field activities and field measurements described in DEP-SOP-001/01 (March 31, 2008) (available from FDEP's website at <http://www.dep.state.fl.us/labs/bars/sas/qa/sops.htm>). Entities that conduct or support field activities and field measurements for FDEP are required to follow these SOPs under Rule 62-160.210 (*Approved Field Procedures*), F.A.C. If an entity would like to apply for a new or alternative field procedure, it should follow the requirements of Rule 62-160.220 (*Approval of New and Alternative Field Procedures*), F.A.C. It should be noted that alternative procedures cannot be approved for the following DEP-SOP-001/01 methods:

<sup>27</sup> Florida Department of Environmental Protection (FDEP). 2007. Chapter 62-303. *Identification of Impaired Surface Waters*. Effective 9-4-07.

<sup>28</sup> Florida Department of Environmental Protection (FDEP). 2001. *Data Quality Assessment Elements for Identification of Impaired Surface Waters*. DEP EAS 01-01, April 2001.

- FS 7410 Rapid Bioassessment (Biorecon) Method.
- FS 7420 Stream Condition Index (D-Frame Dipnet) Sampling.
- FS 7460 Lake Condition Index Lake Composite Sampling.
- FT 3000 Aquatic Habitat Characterization.
- FS 7220 Qualitative Periphyton Sampling.
- FS 7230 Rapid Periphyton Survey.
- FS 7310 Lake Vegetation Index Sampling (LVI).

## 2.2 Analytical Laboratory Certification and Procedures

An entity planning to conduct a biological, chemical, and physical assessment of lake conditions to support SSAC development should ensure that samples are analyzed by a laboratory that is certified by Florida's Department of Health's Environmental Laboratory Certification Program, as described in Rule 62-160.300, F.A.C. Laboratories should comply with relevant FDEP-approved methods as provided in Rule 62-160.320 (*Approved Laboratory Methods*), F.A.C. In addition, the laboratory should operate a QA program consistent with the quality systems standards of the National Environmental Laboratory Accreditation Conference (NELAC), as described in Rule 62-160.300(6), F.A.C. A link to the NELAC website and standards and National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory list pages is provided on FDEP's website at <http://www.dep.state.fl.us/labs/bars/sas/qa/sops.htm>.

If an entity would like to apply for the use of a new or alternative laboratory method, it should follow the requirements of Rule 62-160.330 (*Approval of New and Alternative Laboratory Methods*), F.A.C.

## 2.3 Florida Department of Environmental Protection's Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract (DEP-QA-002/02)

In addition to following DEP-SOP-001/01 methods, it is recommended that entities planning to conduct a biological, chemical and physical assessment of lake conditions to support SSAC prepare a Sampling and Analysis Plan (SAP) in accordance with *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract (DEP-QA-002/02)*<sup>29</sup>. This document describes the content that should be included in a SAP for collecting and analyzing data for FDEP as well as requirements for documentation and recordkeeping, reporting, and data quality control.

<sup>29</sup> Florida Department of Environmental Protection (FDEP). 2002. *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract*. DEP-QA-002/02. Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section, Tallahassee, Florida.

### 3. Recommended Data Quality Procedures for Using Another Scientifically Defensible Approach for Developing SSAC that Is Protective of the Designated Use

An entity might decide to use another scientifically defensible approach for developing SSAC that is protective of the designated use *other than* (or *in addition to*) applying EPA's approach for developing lake criteria to a smaller subset of waters or conducting a biological, chemical, and physical assessment of lake conditions. For example, an entity might want to include additional monitoring data from non-FDEP sources that were collected for a purpose other than Florida nutrient criteria development for lakes (secondary data) instead of (or in addition to) Florida's IWR database (refer to section 2.2.2 of the TSD) to develop an SSAC. These secondary data should be checked to ensure that they are suitable and usable for developing SSAC.

As provided below, section 62-160.670 (*Data Validation by the Department*), F.A.C., describes what information should be checked to ensure that data are suitable and usable for a specific purpose.

- “(a) Completeness of the Department requested data package(s) and the response of involved parties to any Department requests for additional data;
- (b) Integrity of samples as determined by complete and proper sample transmittal documentation, and records that demonstrate adherence to proper preservation, transport or other sample handling protocols, as applicable;
- (c) Proper use of sample collection methods;
- (d) Proper selection and use of analysis methods;
- (e) Sufficient use and routine evaluation of quality control measures to establish the precision, accuracy, sensitivity, and potential bias associated with the analytical system and associated results;
- (f) Proper instrument calibration and verification procedures;
- (g) Documentation of all generated data as provided in Rules 62-160.240 and 62-160.340, F.A.C.;
- (h) Ability to reconstruct all field sampling and laboratory procedures through the documentation and records of the laboratory or field sampling organization as provided in Rules 62-160.240 and 62-160.340, F.A.C.;
- (i) Ability to trace data in the final report to a specific sampling site, date, and time;
- (j) Status of the laboratory's certification through the DOH ELCP as provided in Chapter 64E-1, F.A.C., for any given analyte or category of analytes; and
- (k) Appropriateness of the collected data as related to the specific data quality objectives of the Department program activity or project for which they were collected including those data being considered for secondary use.”

In addition, as described in 62-160.670(3), F.A.C., data should be evaluated against the following data quality indicators described in FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07)<sup>30</sup>:

- 3.0 Laboratory control sample or spike (LCS), including evaluation of LCS recovery
- 4.0 Matrix spikes (MS), including evaluation of MS recovery
- 5.0 Surrogate spikes
- 6.0 LCS duplicates or replicates (LCSD) and matrix spike duplicates (MSD)
- 7.0 Sample duplicates (SD)
- 8.0 Calibrations
- 9.0 Method blanks or other analytical blanks
- 10.0 Field quality control blanks (trip blanks, field blanks or equipment blanks)
- 11.0 Holding times
- 12.0 Quality control check samples for BOD, chlorophyll, and matrix-specific evaluation for known or suspected interferences
- 13.0 Sample preservation checks
- 14.0 Evaluation of the reported MDL
- 15.0 Evaluation of the reported PQL
- 16.0 Evaluation of reversals (parts versus whole comparison), where sample results are evaluated to determine whether the sum of reported parts or fractions for a sample analyte result exceed 120 percent of the corresponded reported or calculated whole.

It is also recommended that secondary data be evaluated against the documentation and recordkeeping requirements, reporting requirements, and quality control requirements of FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02)<sup>31</sup>.

If it is determined during the data evaluation process that secondary data do not meet the data quality objectives described above for nutrient criteria development, those data should not be used for SSAC development.

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<sup>30</sup> Florida Department of Environmental Protection (FDEP). 2008. *DEP-EA 001/07 Process for Assessing Data Usability*. Florida Department of Environmental Protection, Bureau of Standards and Special Projects, Environmental Assessment Section.

<sup>31</sup> Florida Department of Environmental Protection (FDEP). 2002. *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract*. DEP-QA-002/02. Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section, Tallahassee, Florida.

## *B. Data Quality Considerations for Developing Site Specific Alternative Nutrient Criteria for Florida's Rivers and Streams*

As described in section V.C(1) of the preamble for EPA's final rule, *Water Quality Standards for the State of Florida's Lakes and Flowing Waters*, there are several approaches for developing SSAC for rivers and streams. One approach is to replicate the one that EPA used to develop river and stream criteria and apply this method to a smaller subset of waters. Another approach is to conduct a biological, chemical, and physical assessment of river and stream conditions to develop SSAC. A general provision for using another scientifically defensible approach that is protective of the designated use is also provided. A description of the data quality considerations for developing SSAC for these approaches is provided below.

FDEP's *Quality Assurance Rule 62-160*<sup>32</sup> describes the minimum field and laboratory QA, methodological and reporting requirements used to assure that chemical, physical, biological, microbiological, and toxicological data used by FDEP are appropriate and reliable. It applies to all FDEP programs, projects, studies, and other activities that involve the measurement, use, or submission of environmental data or reports to FDEP with the exception of those activities related to air quality and meteorological studies that have no requirements for contamination of soil, water or tissue. Part II (*Field Procedures*) of Rule 62-160 discusses approved field procedures and recordkeeping and reporting requirements for field procedures. Part III (*Laboratory Certification Procedures*) of Rule 62-160 covers laboratory certification, approved laboratory methods, approval of new and alternative laboratory methods, and recordkeeping and reporting requirements for laboratory procedures. Part IV (*Miscellaneous*) discusses sample preservation and holding times, electronic signatures, research field and laboratory procedures, field and laboratory audits, and data validation. In addition to the data verification and validation procedures described in Rule 62-160.670(1) and (2), F.A.C., FDEP evaluates data quality using the data quality indicators described in FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07)<sup>33</sup>

### 1. Data Quality Considerations that EPA Used in Developing Nutrient Criteria for Florida Rivers and Streams

If an entity chooses to apply EPA's approach for developing river and stream criteria to a smaller subset of waters, it should use the same data quality objectives that EPA used for this approach. As described in section 1.3.1 of the *Technical Support Document for U.S. EPA's Final Rule for Numeric Criteria for Nitrogen/Phosphorus Pollution in Florida's Inland Surface Fresh Waters* (USEPA 2010), EPA used the *All Streams Data Set* (see Appendix A3 of the Technical Support Document [TSD], *Data*

<sup>32</sup> Florida Department of Environmental Protection (FDEP). 2008. Rule 62-160. *Quality Assurance*. Effective 12-3-08.

<sup>33</sup> Florida Department of Environmental Protection (FDEP). 2008. DEP-EA 001/07 *Process for Assessing Data Usability*. Florida Department of Environmental Protection, Bureau of Standards and Special Projects, Environmental Assessment Section.

Supporting EPA's Reference Approach for Deriving Numeric Nutrient Criteria for Florida Streams) to develop river and stream nutrient criteria. The *All Streams Data Set* contains all available nutrient data from Florida's STORET and GWIS databases that meet FDEP data quality requirements, as described in FDEP QA rule 62-160 and their "Process for Assessing Data Usability." EPA reviewed these FDEP data quality assurance procedures and determined that they were consistent with EPA quality assurance policies.

## 2. Recommended Data Quality Procedures for Conducting a Biological, Chemical, and Physical Assessment of River and Stream Conditions

### *2.1 Field Activities and Field Measurements*

If an entity wants to conduct a biological, chemical, and physical assessment of river or stream conditions to support SSAC development, it should follow FDEP's approved Standard Operating Procedures (SOPs) for field activities and field measurements described in DEP-SOP-001/01 (March 31, 2008) (available from FDEP's website at <http://www.dep.state.fl.us/labs/bars/sas/qa/sops.htm>). Entities that conduct or support field activities and field measurements for FDEP are required to follow these SOPs under Rule 62-160.210 (*Approved Field Procedures*), F.A.C. If an entity would like to apply for a new or alternative field procedure, it should follow the requirements of Rule 62-160.220 (*Approval of New and Alternative Field Procedures*), F.A.C. It should be noted that alternative procedures cannot be approved for the following DEP-SOP-001/01 methods:

- FS 7410 Rapid Bioassessment (Biorecon) Method.
- FS 7420 Stream Condition Index (D-Frame Dipnet) Sampling.
- FS 7460 Lake Condition Index Lake Composite Sampling.
- FT 3000 Aquatic Habitat Characterization.
- FS 7220 Qualitative Periphyton Sampling.
- FS 7230 Rapid Periphyton Survey.
- FS 7310 Lake Vegetation Index Sampling (LVI).

### *2.2 Analytical Laboratory Certification and Procedures*

An entity planning to conduct a biological, chemical, and physical assessment of river or stream conditions to support SSAC development should ensure that samples are analyzed by a laboratory that is certified by Florida's Department of Health's Environmental Laboratory Certification Program, as described in Rule 62-160.300, F.A.C. Laboratories should comply with relevant FDEP-approved methods as provided in Rule 62-160.320 (*Approved Laboratory Methods*), F.A.C. In addition, the laboratory should operate a QA program consistent with the quality systems standards of the National Environmental Laboratory Accreditation Conference (NELAC), as described in Rule 62-160.300(6), F.A.C. A link to the NELAC website and standards and National Environmental Laboratory Accreditation Program (NELAP)-certified laboratory list pages is provided on FDEP's website at <http://www.dep.state.fl.us/labs/bars/sas/qa/sops.htm>.

If an entity would like to apply for the use of a new or alternative laboratory method, it should follow the requirements of Rule 62-160.330 (*Approval of New and Alternative Laboratory Methods*), F.A.C.

### *2.3 Florida Department of Environmental Protection's Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract (DEP-QA-002/02)*

In addition to following DEP-SOP-001/01 methods, it is recommended that entities planning to conduct a biological, chemical, and physical assessment of river or stream conditions, prepare a Sampling and Analysis Plan (SAP) in accordance with FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract (DEP-QA-002/02)*<sup>34</sup>. This document describes the content that should be included in a SAP for collecting and analyzing data for FDEP as well as requirements for documentation and recordkeeping, reporting, and data quality control.

### 3. Recommended Data Quality Procedures for Using Another Scientifically Defensible Approach for Developing SSAC that Is Protective of the Designated Use

An entity might decide to use another scientifically defensible approach for developing SSAC that is protective of the designated use *other than* (or *in addition to*) applying EPA's approach for developing river and stream criteria to a smaller subset of waters or conducting a biological, chemical, and physical assessment of river or stream conditions. For example, an entity might want to include additional monitoring data from non-FDEP sources that were collected for a purpose other than Florida nutrient criteria development for rivers and streams (secondary data), instead of (or in addition to) EPA's *All Streams Data Set* (see Appendix A3 of the TSD) to develop an SSAC. These secondary data should be checked to ensure that they are suitable and usable for developing SSAC.

As provided below, section 62-160.670 (*Data Validation by the Department*), F.A.C., describes which information should be checked to ensure that data are suitable and usable for a specific purpose.

"(a) Completeness of the Department requested data package(s) and the response of involved parties to any Department requests for additional data;

- (b) Integrity of samples as determined by complete and proper sample transmittal documentation, and records that demonstrate adherence to proper preservation, transport or other sample handling protocols, as applicable;
- (c) Proper use of sample collection methods;
- (d) Proper selection and use of analysis methods;

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<sup>34</sup> Florida Department of Environmental Protection (FDEP). 2002. *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract*. DEP-QA-002/02. Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section, Tallahassee, Florida.

- (e) Sufficient use and routine evaluation of quality control measures to establish the precision, accuracy, sensitivity, and potential bias associated with the analytical system and associated results;
- (f) Proper instrument calibration and verification procedures;
- (g) Documentation of all generated data as provided in Rules 62-160.240 and 62-160.340, F.A.C.;
- (h) Ability to reconstruct all field sampling and laboratory procedures through the documentation and records of the laboratory or field sampling organization as provided in Rules 62-160.240 and 62-160.340, F.A.C.;
- (i) Ability to trace data in the final report to a specific sampling site, date, and time;
- (j) Status of the laboratory's certification through the DOH ELCP as provided in Chapter 64E-1, F.A.C., for any given analyte or category of analytes; and
- (k) Appropriateness of the collected data as related to the specific data quality objectives of the Department program activity or project for which they were collected including those data being considered for secondary use."

In addition, as described in 62-160.670(3), F.A.C., data should be evaluated against the following data quality indicators described in FDEP's *Department of Environmental Protection Process for Assessing Data Usability* (DEP-EA-001/07)<sup>35</sup>:

- 3.0 Laboratory control sample or spike (LCS), including evaluation of LCS recovery
- 4.0 Matrix spikes (MS), including evaluation of MS recovery
- 5.0 Surrogate spikes
- 6.0 LCS duplicates or replicates (LCSD) and matrix spike duplicates (MSD)
- 7.0 Sample duplicates (SD)
- 8.0 Calibrations
- 9.0 Method blanks or other analytical blanks
- 10.0 Field quality control blanks (trip blanks, field blanks or equipment blanks)
- 11.0 Holding times
- 12.0 Quality control check samples for BOD, chlorophyll, and matrix-specific evaluation for known or suspected interferences
- 13.0 Sample preservation checks
- 14.0 Evaluation of the reported MDL
- 15.0 Evaluation of the reported PQL
- 16.0 Evaluation of reversals (parts versus whole comparison), where sample results are evaluated to determine whether the sum of reported parts or fractions for a sample analyte result exceed 120 percent of the corresponded reported or calculated whole.

<sup>35</sup> Florida Department of Environmental Protection (FDEP). 2008. *DEP-EA 001/07 Process for Assessing Data Usability*. Florida Department of Environmental Protection, Bureau of Standards and Special Projects, Environmental Assessment Section.

It is also recommended that secondary data be evaluated against the documentation and recordkeeping requirements, reporting requirements, and quality control requirements of FDEP's *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract* (DEP-QA-002/02)<sup>36</sup>.

If it is determined during the data evaluation process that secondary data do not meet the data quality objectives described in this section for nutrient criteria development for Florida's rivers and streams, those data should not be used for SSAC development.

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<sup>36</sup> Florida Department of Environmental Protection (FDEP). 2002. *Requirements for Field and Analytical Work Performed for the Department of Environmental Protection Under Contract*. DEP-QA-002/02. Florida Department of Environmental Protection, Bureau of Laboratories, Environmental Assessment Section, Tallahassee, Florida.